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Suppliers' Information Note

For The Openreach Network

Optical Spectrum Access Mobile™ Service & Interface Description

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Introduction

This Suppliers' Information Note (SIN) describes the Openreach Optical Spectrum Access Mobile (OSA Mobile) service and its interfaces. OSA Mobile is a product within the Openreach Optical Spectrum Services portfolio. This document should be read in conjunction with the OSA Mobile product description available on the Openreach portal.

https://www.openreach.co.uk/orpg/home/products/opticalservices/opticalservices.do

Optical safety

OSA Mobile uses class 1M laser products so care must be taken when working on or around it. Please refer to IEC 60825 and British Standards Institution BS EN 60825-1:2014.

Under no circumstances should any person look directly into a fibre optic cable or an optical port, as any emitted laser light can cause permanent damage to the eyes.

OSA Mobile equipment chassis and associated Openreach ancillary equipment should only be accessed by an authorised Openreach person or persons under their instruction. The Communications Providers' (CP) suitably qualified engineers are limited to accessing the defined service demarcation points on this equipment only.

Under no circumstances should any person look directly into a fibre optic cable or an optical port, as any emitted laser light can cause permanent damage to the eyes.

General service outline

OSA Mobile is a Hub and Spoke service delivered over Openreach provided single fibre working (SFW) network fibre infrastructure.

OSA Mobile reduces the Openreach equipment requirements at a street furniture site where space and power may be limited. This is achieved by concentrating the OSA Mobile active electronics at a central 'hub' site which is connected to multiple remote sites via 'spoke' bearers. At the remote site, the CP will connect to the OSA Mobile Spoke and use their active optical equipment to complete each wavelength connection.

OSA Mobile wavelength transponder cards are pre-deployed in the hub to support up to 96 wavelength channels, depending on the capacity of the hub purchased.

No Openreach active electronics are installed at the remote site end of the OSA Mobile spoke. Instead, an Openreach passive connection is presented at the end of the Openreach network fibre supporting either a single wavelength channel or multiple wavelength channels.

The CP is required to connect their active equipment at the remote site location to the OSA Mobile spoke using their network optics that are compatible with the network optics of the OSA Mobile service to establish a wavelength connection. Openreach is not responsible for supplying, installing, configuring, or maintaining CP equipment.

OSA Mobile does not support Filter Connect, i.e. direct connection of CP equipment to the optical filter to bypass the Openreach active electronics at the hub is not permitted.

OSA Mobile cannot be used for the purposes of Fibre to the Premises (FTTP) Aggregation.

OSA Mobile structure

The elements of the service are:

OSA Mobile Hub: Depending on the service purchased, an OSA Mobile Hub can support up to 96 wavelength channels each with a dedicated port-based customer handoff. Optical transponder cards are pre-installed in the hub chassis without any network or client optics installed.

OSA Mobile Spoke: this is the optical bearer between the hub and remote end location. This includes passive optical filters at each end of the service as required.

Optical Filter: A pair of passive optical filters enables multiple wavelength channels to share the same optical bearer. A non-filtered spoke bearer option is available which only supports a single wavelength. Optical filters are not shared between spokes.

Wavelengths: A range of speeds and service types are offered. Openreach network and client optics are installed by an Openreach engineer in the OSA Mobile transponder cards at the Hub according to the wavelength service required. To establish an end-to-end wavelength connection, the CP must provide fibre cabling, network and client optics at the remote site that are compatible with and configured to operate with the OSA Mobile service.

Please refer to the OSA Mobile product description, Appendix 8: CP Connectivity Beyond Openreach Demarcation, for guidance on how to obtain the required components to connect the service from the Openreach demarcation. https://www.openreach.co.uk/cpportal/home

Equipment vendor

At the hub site, OSA Mobile uses equipment from the Adtran (formerly Adva) FSP3000 Agile Connect (F7) range.

At the remote site, OSA Mobile presents service using connectors from the Corning PushLok™ range.

Wavelengths

The maximum number of wavelengths currently supported by the OSA Mobile service is five; the minimum is one.

OSA Mobile does not currently support Filter Connect functionality.

1.1 Protocols supported

OSA Mobile currently supports the following wavelength service types:

Ethernet / eCPRI:

- 1GE
- 10GE

CPRI:

- CPRI-3
- CPRI-7
- CPRI-8

1.2 Client connection and service demarcation

OSA Mobile wavelengths are intended for connection to standard optical client interfaces of 850nm multimode or 1310nm single-mode types. No electrical interfaces are offered.

It is the CPs responsibility to ensure optical signal compatibility between equipment used on either side of the demarcation points of OSA Mobile Spoke bearer and wavelength(s).

OSA Mobile Hub

The customer connection and service demarcation point at the hub end of a wavelength is on the allocated client port of a wavelength transponder card in the hub.

The CP is responsible for providing, connecting, and maintaining suitable optical cables to connect to this interface. Either a single duplex or a pair of simplex LC cables may be used to connect to the client interface where appropriate, though duplex cables with dual LC connectors will ensure the correct alignment of transmit (Tx) and receive (Rx) connections. Optical connectors provided by the CP must be of the correct type, be of suitable quality, and be optically clean.

Please use the available fibre support guides to avoid damage to cables.

OSA Mobile Spoke Single

The customer connection and service demarcation point at the remote site end of an OSA Mobile Spoke Single is the single PushLok™ (male) connector presented at the end of the Openreach network fibre.

At the remote site, the CP is responsible for supplying, installing, configuring, and maintaining fibre cabling, network and client optics on their equipment to establish a wavelength connection. Optical connectors provided by the CP must be of the correct type, be of suitable quality, and be optically clean.

Please refer to the OSA Mobile product description, Appendix 8: CP Connectivity Beyond Openreach Demarcation, for guidance on how to obtain the required components to connect the service from the Openreach demarcation.

CP fibre cabling from the OSA Mobile demarcation points must not exceed 500 metres route distance nor exceed 2dB loss.

OSA Mobile Spoke Standard

The customer connection and service demarcation point at the remote end of an OSA Mobile Spoke Standard is the connection ports of the ruggedised filter presented at the end of the Openreach network fibre.

Each C-band channel is presented via a pair of PushLok™ (female) connectors; the bi-directional O-band channel is presented via a single PushLok™ (female) connector.

At the remote site, the CP is responsible for supplying, installing, configuring, and maintaining fibre cabling, network, and client optics on their equipment to establish a wavelength connection. Optical connectors provided by the CP must be of the correct type, be of suitable quality, and be optically clean.

Please refer to the OSA Mobile product description, Appendix 8: CP Connectivity Beyond Openreach Demarcation, for guidance on how to obtain the required components to connect the service from the Openreach demarcation.

CP fibre cabling from the OSA Mobile demarcation points must not exceed 500 metres route distance nor exceed 2dB loss.

Transparency and Error propagation

The OSA Mobile service is designed to provide full transparency, physical layer transparency using 3R signal regeneration is used at the binary level. As transport of client signals occur below layer 2, (at line code / PCS level or physical layer), all layer 2 control protocols are transported transparently.

Synchronous Ethernet (SyncE) with Precision Time Protocol (PTP) is passed transparently by the OSA Mobile equipment.

The Openreach wavelength transponder requires a valid client input signal at each end of the service to activate the network port lasers. In the event of a failure of a client input at one end of the link, this will be propagated to the other end of the link using laser shutdown on the corresponding interface.

It is strongly advised that interconnecting equipment with Loss of Signal error propagation / ALS behaviour is avoided as this scenario will complicate the re-establishment of end-to-end connectivity.

Wavelength optics

The following tables list the Openreach client and network optics available for installation at the OSA Mobile Hub wavelength transponder card to support specific wavelength types. The transponder card can support a mix of wavelength types and speeds.

Openreach Client interface optics

The table below provides details of the optical power margins for both the Receive (Rx) and Transmit (Tx) interfaces of the client facing optical interfaces that may be installed in the wavelength transponder card at the OSA Mobile Hub. Please note that the CP may be responsible for damage caused by exceeding the optical parameters listed. All connections require duplex LC/PC or LC/UPC fibre patch cables.

Service	Speed (Gbit/s)	Adtran Part Name	Mode	Wavelength (nm)	TX Min (dB)	TX Max (dB)	RX Sensitivity (dB)	RX Overload (dB)
1GE	1.25	SFP/GBE/850I/MM/LC/TIN	MM	850	-9.5	0	-17	0
		SFP/GBE/1310S/SM/LC/TIN	SM	1310	-9	-3	-20	-3
CPRI 3	2.46	SFP/2G5U/1310S/SM/LC	SM	1310	-5	0	-18	0
CPRI 7	9.83	SFP+/11GU/850I/MM/LC/TIN	MM	850	-8	-1	-11	-1
		SFP+/11GU/1310S/SM/LC/TIN	SM	1310	-6	0	-11	-1
CPRI 8	10.14	SFP+/11GU/850I/MM/LC/TIN	MM	850	-8	-1	-11	-1
		SFP+/11GU/1310S/SM/LC/TIN	SM	1310	-6	0	-11	-1
10GE	10.32	SFP+/11GU/850I/MM/LC/TIN	MM	850	-8	-1	-11	-1
		SFP+/11GU/1310S/SM/LC/TIN	SM	1310	-6	0	-11	-1

TABLE 1: OPENREACH CLIENT INTERFACE OPTICS. SM = SINGLE-MODE FIBRE CONNECTION; MM = MULTIMODE FIBRE CONNECTION.

Openreach Network optics (O-band Bi-Di)

The table below provides details of the optical power margins for both the Receive (Rx) and Transmit (Tx) wavelengths of the network facing bi-directional (bi-di) optical interfaces that may be installed in the wavelength transponder card at the OSA Mobile Hub.

Service	Speed (Gbit/s)	Adtran Part Name	TX Wavelength (nm)	RX Wavelength (nm)	TX Min (dB)	TX Max (dB)	RX Sensitivity (dB)	RX Overload (dB)
1GE	2.25	SFP/GBE/B1490L/SM/LC/TIN [i]	1460 to 1520	1260 to 1360	-5	0	-24	-3
CPRI 7	9.83	SFP+CDR/11GU/B1330L/SM/LC	1320 to 1340	1260 to 1280	1	5	-15	0.5
CPRI 8	10.14	SFP+CDR/11GU/B1330L/SM/LC	1320 to 1340	1260 to 1280	1	5	-15	0.5
10GE	10.32	SFP+CDR/11GU/B1330L/SM/LC	1320 to 1340	1260 to 1280	1	5	-15	0.5

TABLE 2: OPENREACH NETWORK OPTICS (O-BAND BI-DI)

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[i] This network optic is not compatible with the O-band (U-port) on the 4CSM+ filter.

Openreach Network optics (C-band DWDM)

The table below provides details of the optical power margins for both the Receive (Rx) and Transmit (Tx) interfaces of the network facing DWDM optical interfaces that may be installed in the wavelength transponder card at the OSA Mobile Hub. Please refer to filter port allocations for individual wavelength details.

Service	Speed (Gbit/s)	Adtran Part Name	TX Min (dB)	TX Max (dB)	RX Sensitivity (dB)	RX Overload (dB)
1GE	1.25	SFP/2G5U/Dxxxx.xxU/SM/LC#Dxx	4	7	-28	-9
CPRI 3	2.46	SFP/2G5U/Dxxxx.xxU/SM/LC#Dxx	4	7	-28	-9
CPRI 7	9.83	SFP+/11GU/DCTV/SM/LC	-1	3	-22	-7
CPRI 8	10.14	SFP+/11GU/DCTV/SM/LC	-1	3	-22	-7
10GE	10.32	SFP+/11GU/DCTV/SM/LC	-1	3	-22	-7

TABLE 3: OPENREACH NETWORK OPTICS (C-BAND DWDM)

Customer (CP) network optics

Operating an OSA Mobile wavelength service is reliant on the correct interworking of Openreach supplied network optics and CP supplied network optics. Several key parameters must be considered when selecting CP supplied network optics. These are as follows.

Service	O-band (Bi-Di)	C-band (DWDM)
1G (including CPRI 3)	IEEE 802.3 Table 59–6 and 59-7	Not covered for C-band
10G (including CPRI rates)	IEEE 802.3cp Table 158–6 and 158-7	IEEE 802.3 Table 52–16 and 52-17

TABLE 4: KEY PARAMETERS

Network parameters

Optical fibre specifications

Where a service employing a single-mode network or client interface is provided, all fibre optic connections to and from the service demarcation point use single-mode fibre 9/125 micron according to ITU-T G.652 (A, B, C or D) or G.657 (A1, A2).

An optical loss figure, including maintenance loss, will be provided by Openreach for an OSA Mobile Spoke service. The loss at build will be specified at both 1310nm and 1550nm.

The latency introduced by OSA Mobile equipment is less than 150ns.

The following are not measured or controlled as part of the OSA Mobile service:

- Chromatic Dispersion Compensation
- Polarisation Mode Dispersion (PMD)
- Latency
- Refractive index of the optical fibre (although typically this is approximately 1.47)

Where a service employing a multimode client interface is provided all fibre optic connections to and from the patch panel use multimode fibre according to ITU-T G.651.1.

Optical path loss

Optical path loss calculations and measurement will follow current Openreach practice.

The optical path loss for an OSA Mobile Spoke service will be calculated using the Openreach fibre route length and fibre loss multiplier as shown in the table below. Customer network fibre cabling loss beyond the demarcation points of the service is not included in this calculation.

Item	Loss dB	Unit
Maximum fibre loss: C-band (DWDM)	0.35	Measured at 1550nm per Km of G.652 / G.657 network fibre (SFW)
Maximum fibre loss: O-band (bi-di)	0.50	Measured at 1310nm per Km of G.652 / G.657 network fibre (SFW)
Filter loss (4CSM+): C-band (DWDM)	7.00 (3.50)	per filter pair (figure in brackets is single filter value)
Filter loss (4CSM+): O-band (bi-di)	4.00 (2.00)	per filter pair (figure in brackets is single filter value)
CP network fibre cabling	2.00	500 metres max

TABLE 5: OPTICAL PATH LOSS COMPONENTS

The maximum fibre loss value in the table above includes the loss of any patch panels and fusion splices used by Openreach, fibre ageing and repair margin.

The optical path loss figures at which the Openreach fibre path of a particular OSA Mobile Spoke will be considered faulty is calculated by adding the values listed below to the calculated optical path loss value of the OSA Mobile Spoke.

Fibre route length (Kilometres)	Loss (dB)	Unit
0 – 20 Km	3.0	1310nm / 1550nm
> 20 Km	2.0	1310nm / 1550nm

TABLE 6: MAINTENANCE LOSS

Attenuation

Openreach will calculate the required attenuation, if any, to ensure that the signal power levels are within the normal limits of the network optics at each end of the wavelength service.

The attenuation value will be calculated based on the OSA Mobile network optics used, specifications of the CP network optics used (e.g. transmit and receive power levels), and the estimated optical signal loss between the OSA Mobile Hub and the remote site end of the OSA Mobile Spoke.

Openreach will normally add any required attenuation to the relevant network port on the OSA Mobile wavelength transponder card upon first installation of the wavelength service. C-band attenuation will be applied as necessary independently to the transmit and receive directions of the wavelength service; O-band attenuation will apply equally to the transmit and receive directions of the wavelength service.

Optical safety limits

The CP is responsible for ensuring that their equipment input can accommodate the light levels emitted from the wavelength service interfaces. The CP must also ensure that output levels are within the range required by the service interface and consistent with the relevant standards.

The maximum output power for any CP optical channel shall be no more than +4dB for any filter configuration. This is to ensure that the solution remains compliant with IEC 60825-2 Class 1M (Safety of Optical Fibre Communications Systems) after the WDM signals are combined by the optical filter. It is the CPs responsibility to ensure that light levels for each optical channel do not exceed this figure.

Optical filter frequency plan: 4CSM+ 100GHz

The following plan refers to the A-end LGX filter 4CSM/P+19360-19290 and the B-end ruggedised filter 4CSM/P+19360-19290. The B-end frequencies detailed are the frequencies that the CPs pluggable should be transmitting at.

Client Port	A-end filter input (from OSA Mobile Hub) 4CSM/P 19360-19290 (LGX)			B-end filter input (from CP equipment) 4CSM/P+19360-19290 (ruggedised filter)			
	Frequency (THz)	Wavelength (nm)	ITU channel	Frequency (THz)	Wavelength (nm)	ITU channel	SFW/DFW
U		1330	-		1270	-	SFW
C1	193.60	1548.515	36	193.50	1549.315	35	DFW
C2	193.40	1550.116	34	193.30	1550.918	33	DFW
C3	193.20	1551.721	32	193.10	1552.524	31	DFW
C4	193.00	1553.329	30	192.90	1554.134	29	DFW

Table 7: 4CSM+ frequency plan

Any deviation for the centre C-band (DWDM) frequency from CP equipment should be no more than +/-0.25nm from the equivalent wavelength for the centre frequency specified on a filter card, for example a deviation of +/- 0.38nm is expected to incur an additional loss of 1dB.

The deviation tolerance for O-band (bi-di) frequencies is 1270nm +/- 10nm.

Maximum Reach

Forward Error Correction (FEC) is not used.

Amplification options are not currently available.

Service Type							Minimum expected performance for CP network optics		CP optical transceiver comparable to:
GbE	CPRI-3	10GbE	CPRI-7	CPRI-8	Optical Layer [ii]	Maximum Span (km)	Tx dB	Rx dB	
Y	Y	n	n	n	DWDM	52	0	-24	1000BASE-DWDM [iii]
Y	n	n	n	n	Bi-Di	30	-5	-23	1000BASE-BX40 Error! Bookmark not defined.
n	n	Y	Y	Y	10G DWDM	35	0	-23	10GBASE-ZR Error! Bookmark not defined.
n	n	Y	Y	Y	10G O-band	10	-3	-21	10GBASE-BR40
n	n	Y	Y	Y	10G Bi-Di	18	-3	-21	10GBASE-BR40

TABLE 8: MAXIMUM REACH (KM)

[ii] DWDM and O-band via filter; Bi-Di direct to line.

[iii] Not an IEEE standardised interface.

Equipment specifics

OSA Mobile Hub

OSA Mobile Hub equipment is suitable for installation in licensed areas of BT Exchanges that meet the environmental, power and safety requirements of the OSA Mobile Hub chassis and supporting equipment.

Chassis Type	Operating Temperature	Relative Humidity	Dimensions	Weight
1U E-Temp (12 ports)	-20°C to +60°C	Max 85% at 65°C (non-condensing)	448mm (W) x 212mm (D) x 44.5mm (H)	5.7 kg
7U (48 ports)	+5°C to +40°C	Max 85% at 40°C (non-condensing)	452mm (W) x 295mm (D) x 311mm (H). Allow additional 92mm (D) from shelf bracket for front cover.	19 kg
7U (96 ports)	+5°C to +40°C	Max 85% at 40°C (non-condensing)	452mm (W) x 295mm (D) x 311mm (H) Allow additional 92mm (D) from shelf bracket for front cover.	27 kg
1U LGX chassis	+5°C to +40°C	Max 85% at 40°C (non-condensing)	480mm (W) x 102mm (D) x 44mm (H)	0.5 kg (empty)
3U LGX chassis	+5°C to +40°C	Max 85% at 40°C (non-condensing)	452mm (W) x 126mm (D) x 135mm (H)	1.75 kg (empty)

Table 9: Chassis environmental

There are two chassis types available in either AC or DC power, these are detailed in the table below.

For all chassis types and power options Openreach requires the following additional power supplies:

- A 240V AC supply using a 13A switched socket to power the remote network management system. The socket must be within 1.5m of that equipment.
- A 240V AC power supply to power Openreach test equipment during both initial commissioning and subsequent maintenance support activities. This socket must be within 1.5m of the chassis.

It is the customer's responsibility to provide and maintain the power supply for the OSA Mobile service. The rack where the OSA Mobile Hub will be installed must be grounded with a clean earth supply. Further information on installation and power requirements is available from the OSA Mobile product description.

Chassis Type	Chassis height [iv]	Mounting	AC power	DC power	Typical power consumption	Max. power consumption
1U E-Temp (12 ports)	1U	ETSI	Dual. Front. Hot swap	Dual. Front. Hot swap	95W (DC) 95W (AC)	185W (DC) 185W (AC)
7U (48 ports)	3U	ETSI	Dual. Front. Hot swap	Dual. Front. Hot swap	275W (DC) 275W (AC)	335W (DC) 335W (AC)
7U (96 ports)	3U	ETSI	Dual. Front. Hot swap	Dual. Front. Hot swap	510W (DC) 510W (AC)	610W (DC) 610W (AC)
1U LGX chassis	1U	ETSI compliant	n/a	n/a	n/a	n/a
3U LGX chassis	3U	ETSI compliant	n/a	n/a	n/a	n/a

Table 10: Chassis power

Chassis Type	Power	Power feeds	Fuse per power feed (Amps)	Power Cable Termination
1U E-Temp (12 ports)	AC	2	5A	Supplied AC power cables are 2.5m long and have a standard 13A plug (BS1363) for connection to the AC supply and a right angled IEC60320 type C5 for connection to the type C6 on the NTE.
1U E-Temp (12 ports)	DC	2	10A	MOLEX connector
7U (48 and 96 ports)	AC	2	10A	Supplied UK plug with 10A fuse, 2.5m length and an IEC60320 type C13 for connection to the type C14 on the NTE.
7U (48 and 96 ports)	DC	2	25A (using 2.5mm^2 cable)	Cable termination
1U LGX chassis	n/a	n/a	n/a	n/a

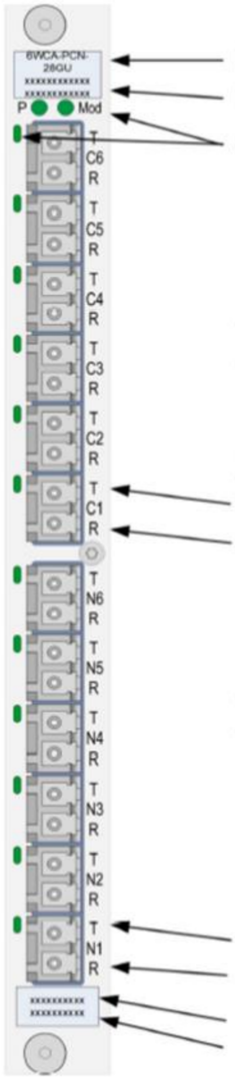
[iv] Excludes filters, signal correction equipment, fibre trays.

3U LGX chassis	n/a	n/a	n/a	n/a

Table 11: Chassis power supply requirements

OSA Mobile transponder card

The OSA Mobile transponder card is installed in the OSA Mobile Hub. The information below is intended to assist the CP engineer in analysing potential service issues only. The CP engineer is not permitted to make any adjustments or changes to the Openreach client or network optics, or any fibre cabling leading to the Openreach network.



Module name

USI code

Status LED indicators

The port description of the client interface no. 1 applies to the client interfaces no. 2 through 6 accordingly.

Client interface no. 1 equipped with any SFP/SFP+/SFP28 transceiver.
Transmitter connector (C1-T) for client signal output
Receiver connector (C1-R) for client signal input

The port description of the network interface no. 1 applies to the client interfaces no. 2 through 6 accordingly.

Network interface no. 1 equipped with any SFP/SFP+/SFP28 transceiver.
Transmitter connector (N1-T) for network signal output
Receiver connector (N1-R) for network signal input

Item number and HW revision

Serial number

Important note

The Openreach wavelength transponder requires a valid client input signal at each end of the service to activate the network port lasers.

LED indicators

LED Indicators	
P	Module power supply status
Mod	Module operating status
C1 to C6	Operating status of client ports 1 to 6
N1 to N6	Operating status of network ports 1 to 7

TABLE 12: LED INDICATORS

LED indicators meaning

LED name	LED colours	Potential cause	CP action
All LEDS	Red	A serious error in card initialisation	Report issue to Openreach
P	Yellow	Power is abnormal	Report issue to Openreach
	Off	Power failure	Report issue to Openreach
	Green	Power is OK	No action is required
Mod	Red	Initialisation failure	Report issue to Openreach
	Yellow flashing to Off	No management communication	Report issue to Openreach
	Off	Admin state is 'disabled'	Report issue to Openreach
		Admin state is 'unassigned'	Report issue to Openreach
	Green	Module operation is normal	No action is required
Cx, Nx	Red	Pluggable transceiver was inserted, and the interface provisioned, then the pluggable transceiver was removed.	Report issue to Openreach
		Tx laser failure	Report issue to Openreach
Cx, Nx	Yellow	Loss of clock	Verify that the provisioned service type matches the incoming signal type
			Check optical power levels
		Loss of signal	Verify that fibre cables are connected
			Check optical power levels
		Optical input power out of range	Measure the optical input power on the receiver connector and compare the measured value with the channel module/pluggable transceiver specification.
			Adjust the optical input power (install the appropriate attenuators) at the receiver to ensure the optical input power requirements are met.
Cx, Nx	Off flashing to red	Pluggable transceiver mismatch. None of the data rates supported by the installed pluggable transceiver match the data rates supported by the channel module.	Install the correct pluggable transceiver.
Cx, Nx	Off	There is no Ch port (facility) provisioned on the pluggable transceiver.	Report issue to Openreach
		The channel interface (facility) admin state is disabled.	Report issue to Openreach

	Green	Interface operation is normal.	No action is required.

TABLE 13: LED INDICATOR MEANING

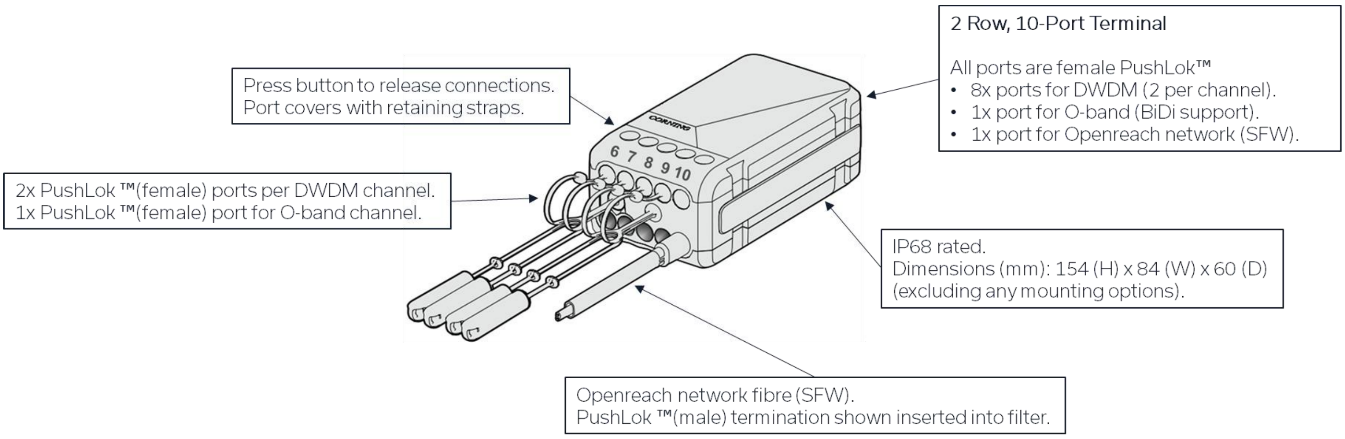
OSA Mobile 4-channel optical filter

The OSA Mobile Spoke Standard uses a matched pair of 4-channel filters (4CSM/P+19360-19290). The filter name refers to the number of C-band channels. A fifth O-band channel is also available subject to the network fibre route distance.

At the hub end of the spoke, the 4CSM+ filter is installed in an LGX passive chassis. Each filter channel is connected to a network port of a wavelength transponder card as appropriate by the Openreach engineer installing the service.

At the remote end of an OSA Mobile Spoke Standard, the corresponding ruggedised 4CSM+ filter is installed by the Openreach engineer. This filter presents five channels to the customer as follows.

- four channels are for DWDM (C-band) wavelength connections each presented via a pair of PushLok™ (female) connectors.
- the fifth port is for bi-directional (O-band) optics presented via a single PushLok™ (female) connector.



2 Row, 10-Port Terminal

All ports are female PushLok™
- 8x ports for DWDM (2 per channel).
- 1x port for O-band (BiDi support).
- 1x port for Openreach network (SFW).

Press button to release connections.
Port covers with retaining straps.

2x PushLok ™(female) ports per DWDM channel.
1x PushLok ™(female) port for O-band channel.

IP68 rated.
Dimensions (mm): 154 (H) x 84 (W) x 60 (D)
(excluding any mounting options).

Openreach network fibre (SFW).
PushLok ™(male) termination shown inserted into filter.

FIGURE 1: 4-CHANNEL RUGGEDISED FILTER

Sufficient space must be provided and maintained within the remote site enclosure where the OSA Mobile service is terminated to permit engineering access to the filter and connection ports. A wooden backboard, or similar, should be provided to allow the secure fastening of the ruggedised filter within the remote site enclosure.

PushLok connector

At the remote end of an OSA Mobile Spoke, Openreach will install a fibre optic cable terminated with a Corning PushLok™ male connector. This is the customer connection point for OSA Mobile Spoke Single. OSA Mobile Spoke Standard will connect a ruggedised filter to this connector to present a channelised service.

Further Information

For enquiries concerning connection availability between sites and for further product information about this service please visit the website at www.openreach.co.uk or contact your Openreach Sales & Relationship Manager or sales specialist.

If you have enquiries relating to this document, then please contact: orsinsfa@openreach.co.uk

References

ITU-T G.652	Characteristics of a single-mode optical fibre and cable
ITU-T G.657	Characteristics of a bending-loss insensitive single-mode optical fibre and cable
IEC 60825-1	Safety of laser products - Part 1: Equipment classification and requirements
IEC 60825-2	Safety of laser products - Part 2: Safety of optical fibre communication systems
Gigabit Ethernet	IEE 802.3z or SIN 360 Gigabit Ethernet for the BT Network

Please see information available at: https://www.openreach.co.uk/orpg/home/helpandsupport/sins/sins.do regarding the availability of Openreach published standards.

Abbreviations

Bi-Di	Bi-directional
CP	Communications Provider
DWDM	Dense Wavelength Division Multiplexing
Gbit/s	Gigabits per second
IEC	International Electrotechnical Commission
ITU-T	International Telecommunication Union - Telecommunications standardization Sector
km	Kilometre
LC	Lucent Connector
LAN	Local Area Network
MM	MultiMode
MPO	Multi-fibre Push On
Nm	Nanometre
Ns	Nanosecond
NTE	Network Terminating Equipment
NTP	Network Terminating Point
OSA	Optical Spectrum Access
OSNR	Optical signal-to-noise ratio
PHY	Physical Layer
Rx	Receive
SC	Standard Connector / Subscriber Connector
SIN	Supplier Information Note
SM	Single Mode
Tx	Transmit
WDM	Wavelength Division Multiplexing

History

Issue	Date	Changes
1.0	28 April 2024	First issue for Pilot
1.1	20 December 2024	Update to ‘Table 14 Optical path loss components’ to show loss per filter pair and per filter.
1.2	1 July 2025	Table 8 ‘Maximum Reach’: Update to 10G O-band and 10G Bi-Di Tx and Rx values. Update to 25G DWDM and 25G O-band Maximum Span and Tx and Rx values. Table 11: Chassis Power Supply Requirements: Correction of AC power cable connector details for 1U E-Temp and 7U chassis types.
1.3	09 April 2026	Launch version Table 7: Updated 4CSM+ frequency table (A end and B end) within section 6.5 25G values removed as not currently available.

*** END***